



## Specific Features of Magnetic Storms on the Cardiovascular System

1. **Khodjamberdiev Akram  
Ilkhamjanovich**

Received 22<sup>nd</sup> Apr 2022,  
Accepted 23<sup>rd</sup> May 2022,  
Online 30<sup>th</sup> Jun 2022

**Abstract:** The Earth's magnetic field and its variations resulting from the influence of solar activity on the ionosphere of the planet belong to natural magnetic fields. A permanent geomagnetic field is generated by currents in a liquid metal core, and varies depending on geographical latitude.

**Keywords:** magnetic storm, cardiovascular system, patient, modern medicine, vascular diseases.

<sup>1</sup> Teacher, Fergana Public Health Medical  
Institute Uzbekistan, Fergana

Arterial hypertension (AH) continues to be one of the most pressing problems of humanity and modern medicine. In the last decade, vascular diseases of the heart and brain associated with it have taken the first place among the causes of mortality of the population.

Features of arterial hypertension in the North consider its development in young people and unfavorable clinical course with frequent crises, rapid progression, the presence of complications in the form of coronary heart disease and chronic heart failure. Undoubtedly, exogenous factors such as solar activity and geophysical disturbances make a great contribution to the development of such complications.

The conditions in the space around us are constantly changing: day and night, winter and spring. The work of the body is also changing. Adapted people rebuild painlessly.

If a person is unwell, or his resistance is reduced, then adaptation to new conditions is difficult: discomfort, various pains are felt. Many people feel the upcoming weather change, experiencing headaches, joint pain, and heart. These are meteorolabile people.

Meteorologists often say: "Changes in atmospheric pressure, geomagnetic disturbances and magnetic storms, changes in air temperature are expected." These are unfavorable days for sick, weakened and overworked people. During explosions on the Sun, streams of charged particles are ejected into interplanetary space. Reaching the shell of the Earth, they cause its disturbance. The instruments register magnetic storms characterized by gradual or sudden onset. A magnetic storm with a gradual onset is factors acting on the body already on the second day after the storm begin. Magnetic storms with a sudden onset affect immediately after the storm begins.

Some behave inappropriately in difficult situations, but in everyday life they can commit difficult-to-explain actions. Inattention, lethargy, agitation or mental depression - all this can be observed in large groups where people are connected by performing a single task, for example, on transport. Experienced workers make a chain of mistakes, which leads to an accident. It is on unfavorable days that technical malfunctions occur, and unpredictable behavior of personnel is possible. This means that during the days of magnetic storms, both increased attention and concentration are necessary. Only the person himself can determine the body's reaction to these factors.

1. Cardiovascular diseases (CVD) are the most common, and mortality from them is the greatest. The deterioration of the health of these patients is closely associated with unfavorable days. In the case when they follow each other without a break (or the breaks are 1-2 days), there is a noticeable increase in appeals in the following days due to the exacerbation of diseases.
2. During magnetic storms, blood clotting increases, platelet formation is activated, and cardiovascular catastrophes occur. Myocardial infarctions (MI) that occur during these periods are more severe, with complications.
3. During this period, all "hypertensive patients" felt worse. Some patients reacted within a day, others - on the day of the magnetic storm or the next day. Patients experienced headache, bruising, poor sleep, lethargy, heart pain, irritability. Only on the second day after the storm, blood pressure stabilized.
4. During periods of magnetic storms, patients suffering from coronary heart disease experience oxygen deficiency (its metabolism is disrupted). Therefore, an oxygen cocktail and a stay in the fresh air are useful for them.
5. Patients with acute cerebrovascular accident (ONMC) are most susceptible to the influence of a magnetic storm. They have increased aggregation (adhesion) of platelets in the blood, which leads to the development of stroke.

The condition of some patients worsens immediately after the onset of the magnetic storm, and the condition of others worsens after its end. Severe patients react earlier than those whose health condition is better. All these exacerbations can be prevented. There is a sufficient number of drugs, it is important to apply them in time and in the right doses. It is recommended to start treatment on the eve of magnetic storms.

The problem of maintaining health is to take those medications that have already been tested and prescribed by the attending physician for each patient in a timely manner, taking into account the forecasts of unfavorable days.

1. Patients suffering from diseases of the cardiovascular system, start taking their usual medications the day before the magnetic storm.
2. Patients undergoing medical treatment are recommended to increase the dose of medications taken during the magnetic storm and on the eve of it.

How to keep healthy on unfavorable days?

To increase the reserve capacity of the body, i.e. to strengthen your health. If at the same time you cross the line of meteorological stability (stop feeling the change in weather conditions and the onset of unfavorable days), then the goal has been achieved. Your body is again able to react painlessly to the changed conditions, and you do not feel the onset of unfavorable days. They are not there for you

as long as you manage to maintain your health at the appropriate level. In order not to get sick, it is necessary to prevent the disease. Prevention is both medical treatment, physical education, and proper organization of work, rest, and nutrition.

Recommendations for the protection of patients suffering from cardiovascular diseases:

1. During magnetic storms, limit physical activity. The rehabilitation regime of patients with acute myocardial infarction should not be expanded.
2. Review the dosage of drugs prescribed to patients suffering from cardiovascular diseases, in the direction of increasing it or increasing the frequency of doses per day.
3. To protect the autonomic nervous system, it is advisable to connect tinctures of valerian, motherwort, peony, meprobamate, tazepam, seduxen.
4. When headaches appear or increase against the background of increased venous pressure in the cerebral system in patients with neurocirculatory dystonia, the use of diuretics (hypothiazide, furosemide) is recommended.
5. In connection with increased blood clotting and increased platelet function, disaggregants (aspirin) should be prescribed.
6. During magnetic storms, oxidation processes are accelerated, this must be compensated by the appointment of ascorbic or glutamic acid.
7. Patients with signs of cerebrovascular insufficiency due to cervical osteochondrosis or atherosclerosis should use drugs that improve blood supply to the brain (cavinton, stugeron, cinnarizine).
8. Strictly follow a diet (limit the consumption of foods rich in fatty acids, spicy, salty food). Eat poultry meat, fish, fruits, vegetables, dairy products. Normalize the work and rest regime, provide an 8-hour full sleep. Smoking and alcohol consumption are strictly contraindicated during treatment.

Such prevention is effective. However, it is possible that even after it, patients suffering from arterial hypertension and coronary heart disease have exacerbations during periods of magnetic storms. To avoid this, the day before the start of the unfavorable period, carry out treatment. When a magnetic storm has set in, the effectiveness of treatment may decrease.

We remind you those on unfavorable days, the number of road accidents and accidents in complex industries increases. Therefore, on such days and the day before, you need to be especially careful.

We have studied the incidence of complications in patients with cardiovascular diseases (hypertensive crises, myocardial infarction and acute disorders of cerebral circulation).

When analyzing medical information materials, it was revealed that during periods of increased geomagnetic disturbance, hypertensive crises and acute disorders of cerebral circulation in patients with arterial hypertension, acute myocardial infarction in patients with coronary heart disease are most often recorded. The greatest number of diseases occurs in the spring and autumn periods of the year. In March-May and September-October, the number of calls for cardiovascular diseases increases. This increase coincides with the semi-annual maxima of morbidity and mortality well-known in medical practice, as well as the maxima of the "equinox" semi-annual wave of the geomagnetic disturbance level (equinox semiannual wave). Based on this, it can be assumed that in March-April and

September-October, the geomagnetic situation becomes a constant stress for people. This undoubtedly aggravates the course and prognosis of cardiovascular diseases. From the point of view of medical statistics, this will look like an increase in the number of sudden deaths, emergency medical calls, etc. Statistics have shown that the risk of acute myocardial infarction in women is several times higher than that in men aged 50 years and older. Men are more magnetically unstable and are at risk of developing coronary heart disease and complications before the age of 50. After the age of 50, men experience a decrease in magnetic sensitivity, most likely due to the stabilization of adaptive processes of the body due to the formation of resistance to geophysical factors. On the contrary, women are more magnetically sensitive after 50 years and older, perhaps this is due to the menopause period, which is accompanied by a deficiency of estrogen due to the natural extinction of ovarian function. Thus, the age and gender of patients are the defining moments in the development of such complications.

In addition, we conducted a statistical analysis using the method of superimposing epochs of cases of patients with cardiovascular diseases visiting a medical institution during large geomagnetic disturbances. In the year of increased geophysical activity, the response of patients to geomagnetic disturbances was 2-4 days ahead of the day of maximum geomagnetic disturbance. That is, the maximum treatment of patients occurred at the time of a disturbance in the Sun, and the source affecting a person's well-being may be strong electromagnetic radiation or very energetic particles.

In a geophysically calm year, the coincidence of periods in the power spectra of solar wind parameters, near-Earth space and medical indicators is very insignificant. The coincidence of the periodicity of solar wind processes with the periodicity in near-Earth space and in medical data per year near the maximum of geophysical disturbance and the insignificant manifestation of such a coincidence near the minimum of geophysical disturbance are additional evidence of the impact of helio-geophysical factors on patients with cardiovascular pathology.

Thus, the analysis of medical information materials and geophysical disturbance data proved that solar activity and geomagnetic disturbances have an impact on the course and prognosis of complications. The existing assumption is confirmed that there is a relationship between geomagnetic activity and the number of patients who used emergency care for exacerbation of cardiovascular diseases.

#### References:

1. Aghajanyan, N.A. Habitat and reactivity of the organism [Text] / N.A., Aghajanyan, I.I. Makarova. - Tver: publishing house "Surname", 2001. - 176 p.
2. Budyashova, S.Yu. On the effect of magnetic fields on biological objects [Text] /S.Y. Budyashova, JINR.- Dubna, 1990. - 148 p.
3. Boyzakova U. СЕКЦІЯ: ІСТОРІЯ //Проблеми та перспективи розвитку науки на початку третього тисячоліття у країнах Європи та Азії. – С. 21.
4. Boenko, N.D. On the influence of the climate of Transbaikalia on the human body [Text] / , N.D. Boenko, V.A. Kozlov.- Chita. 1959. - 75c.
5. Anvar D. SOCIO-POLITICAL ACTIVITY OF YOUNG PEOPLE–AS AN IMPORTANT SOCIAL VALUE //Gospodarka i Innowacje. – 2022. – T. 24. – C. 142-145.
6. Breus, T.K. Magnetic storms: biomedical and geophysical aspects [Text] / T.K. Breus, S.I. Rapoport. - M.: Soviet Sport, 2003. - pp. 14-15.
7. Gnevyshev, M.I. Sudden death from cardiovascular diseases and solar activity [Text] /M.I. Gnevyshev, K.F. Novikova, I.A. Ol // Influence of solar activity on the atmosphere and biosphere of the Earth. - M.: Nauka, 1871. - pp. 179-187.